

Mercury (Hg)

Health Effects and Reducing Exposure

Will Humble

Arizona Department of Health Services

Primary Human Exposures

- Bioaccumulation (build-up) in food chain
 - Old large fish and shellfish (swordfish, tuna, king mackerel, and tilefish)
 - Cereals
 - Vegetables (mushrooms)
 - Meats
- Silver dental fillings - especially with chewing gum



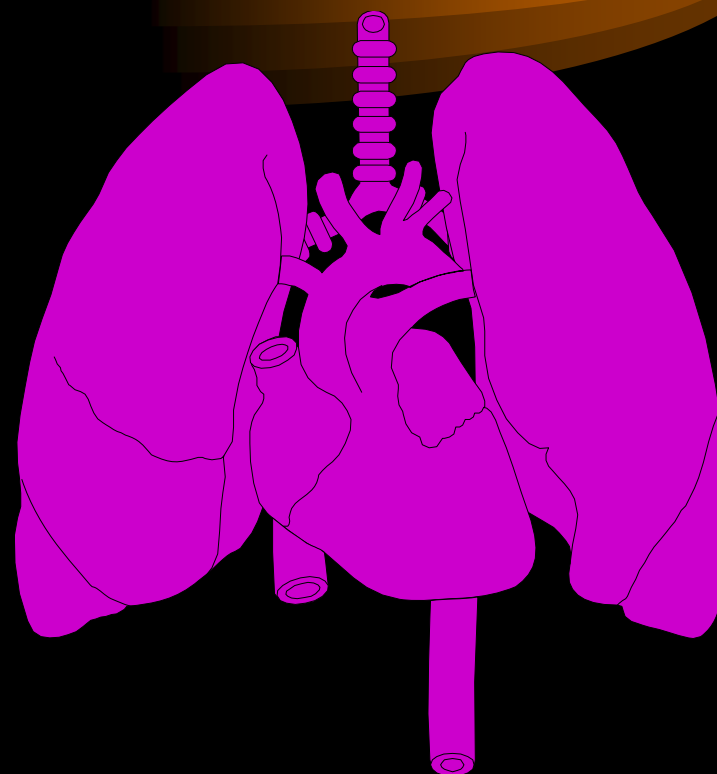
Secondary Human Exposures

- Spills
- Home remedies
- Cosmetics
- Cultural practices that use mercury



Secondary Human Exposures *(contd.)*

- Breathing air from combustion or spills
- Mining
- Coal-burning power plants (1/3 of US releases)
- Natural deposits
- Disposal and incineration of solid wastes containing mercury
 - Municipal
 - Hospital or medical



Exposure Builds Over Time



- Regardless of what route of exposure – once inside the body mercury is very slowly eliminated and builds up over time.

Primary Health Target is the Nervous System

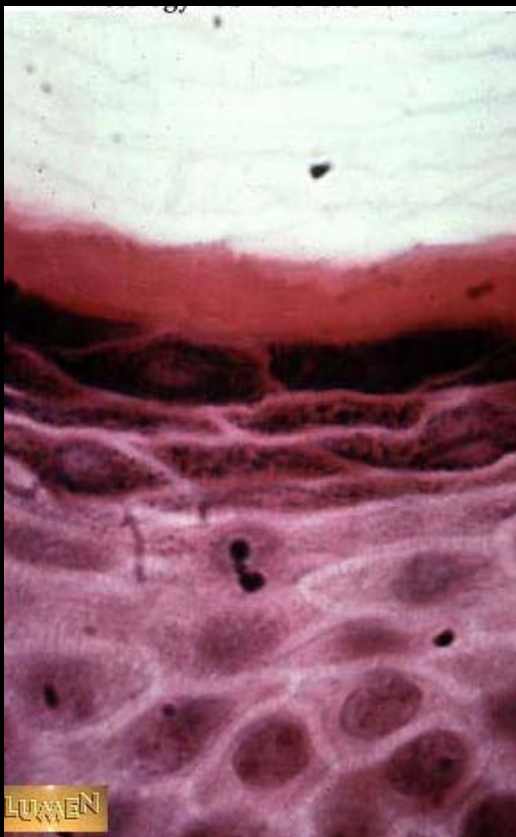
- Irritability
- Shyness
- Tremors
- Altered vision or hearing
- Impaired memory
- Language and attention deficits
- Delayed nerve conduction and pins and needle feeling
- Seizures
- Brain damage

Primary Health Effects: Reproductive/Developmental

- Increased miscarriages
- Infant deafness
- Blindness
- Mental retardation
- Cerebral Palsy
- Low birth weight



Other Health Effects: Direct Contact (usually occupational)



- Irritation of skin and eyes
- Skin allergy with itching and rash
- May cause graying of the skin

Health Effects: Inhalation

(usually occupational)

- Irritate lungs
- Cough
- Shortness of breath
- Chest pain
- Nausea/vomiting
- Diarrhea
- High blood pressure
- Repeated low exposure or single does high exposure:
 - Tremors
 - Impaired memory and concentration
 - Mood changes
 - Weight loss
 - Decreased appetite

Indications of Exposure



- Urine – test for exposure to metallic mercury vapor and inorganic mercury
- Blood – test for recent exposure to methyl mercury
- Hair – detect exposure to methyl mercury from longer ago
- Breast milk

Reducing Personal Exposure & Risk

- Choose non-mercury containing dental fillings, but don't replace metal fillings just to remove mercury because it may actually increase exposure.
- Follow FDA fish advisories
 - pregnant women, nursing mothers and young children should not eat shark, king mackerel, tile fish or swordfish

Reducing Personal Exposure & Risk



- Limit intake of other types of fish to 12 ounces a week (3-4 servings depending on size)
- Selenium and Vitamin E may be protective against methyl mercury

Reducing Home Exposure



Careful handling and disposal of mercury products such as thermometers and fluorescent lights

Do not vacuum spilled mercury because it will vaporize

Do not incinerate mercury containing products

Reducing Workplace Exposure



Proper protective equipment and ventilation

Wash immediately after exposure and before
going home

Change clothes at work and launder separately

Reducing Global Releases



- Half of global Hg releases are from industrial sources:
 - coal burning
 - mining
 - smelting
 - solid waste incineration

Policy

- EPA and FDA drinking water limit for inorganic mercury is 2 ppb.
- FDA limit for methyl mercury in seafood is 1 ppm.
- OSHA 8 hour shift 40 hour work week limit for organic mercury is 0.1 mg/cubic meter and 0.05 mg/cubic meter for metallic mercury vapor.
- NIOSH recommends 10 hour shift average air limit of 0.05 mg/cubic meter.

Resources

- ATSDR ToxFAQs
www.atsdr.cdc.gov/tfacts46.pdf
- NJ Fact Sheet
www.state.nj.us/health/eoh/rtkweb/1183.pdf
- EPA Chemical Fact Sheet
www.epa.gov/OGWDW/dwh/t-ioc/mercury.html
- Scorecard www.scorecard.org/chemical-profiles/summary.tcl?edf_substance_id=7439-97-6